



Subject card

Subject name and code	Medical rehabilitation, PG_00065018						
Field of study	Mechanical and Medical Engineering						
Date of commencement of studies	February 2025		Academic year of realisation of subject			2025/2026	
Education level	second-cycle studies		Subject group			Obligatory subject group in the field of study Subject group related to scientific research in the field of study	
Mode of study	Full-time studies		Mode of delivery			at the university	
Year of study	1		Language of instruction			Polish	
Semester of study	2		ECTS credits			3.0	
Learning profile	general academic profile		Assessment form			assessment	
Conducting unit	Institute of Mechanics and Machine Design -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		Dominika Szalewska				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	30.0	0.0	0.0	45
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	Number of study hours	45		8.0		22.0	75
Subject objectives	Developing and deepening knowledge and social competences obtained during engineering studies in the field of medical rehabilitation. Familiarizing with the methods and objectives of rehabilitation as a medical and socio-professional process, indications and contraindications for rehabilitation in cardiovascular diseases, in respiratory diseases, in diseases of the nervous system, audiology, phoniatriy and diseases of the musculo-skeletal system. Presentation of the latest technological and ICT solutions used in medical rehabilitation.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_U12] develops her/his own potential and independently plans own, lifelong learning, while also being able to guide others in this regard	The student uses the correct nomenclature of medical rehabilitation. Explains the principles of apparatus and devices applicable in medical rehabilitation.	[SU3] Assessment of ability to use knowledge gained from the subject
	[K7_U03] uses knowledge related to diagnostic techniques, medical and rehabilitation procedures, anatomy and physiology to formulate assumptions referring to design and research procedures	The student presents and describes the principal indications to medical rehabilitation; discusses basic diagnostic techniques like cardiopulmonary exercise test on treadmill or cycleergometer, knows therapeutic methods like physical therapy, eksoskeleton, exercise training.	[SU3] Assessment of ability to use knowledge gained from the subject
	[K7_K11] is aware of importance of professional acting, the need for critical verification of acquired knowledge and consulting experts opinion in case of facing difficulties with individual problem solving	The student is able to use the internet search engines in order to find scientific papers concerning medical rehabilitation, understands the need of cooperation of rehabilitation team members: the specialist in physical medicine in rehabilitation, nurse, physiotherapist, psychologist, occupational therapists, speech-therapists, rehamanagers, etc.	[SK4] Assessment of communication skills, including language correctness
	[K7_W02] has structured and well-founded knowledge covering fundamental issues in the field of medical sciences allowing to design medical devices, rehabilitation systems and to formulate research procedures	The student knows and is able to present methods of rehabilitation applicable in patients with circulatory system diseases, respiratory system, orthopedic disorders and neurological system diseases.	[SW1] Assessment of factual knowledge
Subject contents	<p>In-depth knowledge of devices and systems used in medical rehabilitation. Rehabilitation as a medical-social-professional process. Rehabilitation of patients with diseases of internal organs, including the cardiovascular and respiratory systems, audiology, phoniatrics, gynecology and obstetrics. Medical rehabilitation of patients with diseases of the nervous system. Rehabilitation in diseases of the musculoskeletal system. Adapted physical activity as a supplement to the rehabilitation offer for people with disabilities. Discussion of diagnostic and therapeutic devices used in cardiac and pulmonary rehabilitation, including bicycle ergometers, treadmill and armchair for endurance training, sets for strength training and physical therapy. Discussions on the construction and operation of the spiroergometer. Discussion of the construction and operation of devices for spirometry and exercise assessment of gases in the exhaled air, paying attention to the differences in devices from different manufacturers. Presentation of devices used to measure or estimate physical capacity, i.e. sets for exercise tests with the use of cycloergometers and a mobile treadmill as well as an echocardiograph as a device for assessing adaptive changes in the heart muscle in athletes and sick people. Attention is drawn to the differences in the concepts of: physical capacity and physical fitness. Learning methods of muscle strength measurement, muscle structure model, biomechanical and structural parameters of the human locomotor system, Hill's theory. To familiarize students with the balance platform for assessing balance and conducting proprioceptive training with visual and acoustic biofeedback. The ACX.rehab system, which is a concept of modern rehabilitation and diagnostics in virtual reality, combining classic rehabilitation methods with the possibilities of modern technology. Rehabilitation in diseases of the respiratory system. Rehabilitation of patients with diabetes and renal failure after cardiac surgery. Discussion of the differences in the management of patients suffering from various diseases; rehabilitation after coronary aortic bypass procedures, after heart valve replacement, after heart transplantation. The role of education and rehabilitation. Rehabilitation management specialist as a new member of the rehabilitation team. Telemedicine in neurological and cardiological rehabilitation. Limb prostheses. The role of rehabilitation education. Rehabilitation management specialist as a new member of the rehabilitation team. Telemedicine in neurological and cardiological rehabilitation. Limb prostheses. Overview of construction, types, applications, control; cyberhand - the prosthesis of the future; the most common orthoses of the upper limb. Prostheses and orthoses of the lower limb - general structure, division due to construction and application, modern knee joints; c-leg - prosthesis of the future; the most common orthoses of the lower limb. Correct body posture and the most common postural defects in children and adults; body posture assessment methods; auxiliary tests and devices used in rehabilitation - balance platform, hand-tutor, dynamometer. physical therapy. Deepening the knowledge obtained during engineering studies in the field of rehabilitation in audiology and laryngology. Delos - a system for assessing and training stability, posture and body balance. Exoskeleton with functional electrostimulation in the therapy of patients after stroke and spinal cord injuries.</p>		
Prerequisites and co-requisites	Knowledge, skills and social competences in the subject: motor rehabilitation engineering or in the subjects: human anatomy, human physiology or other medical subjects or obtaining an engineer's degree.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	odsetek prawidłowych odpowiedzi	60.0%	100.0%

Recommended reading	Basic literature	1. Kwolek A. (red.). Rehabilitacja medyczna Tom I i II, Wyd. EdraUrban&Partnen,Wrocław 2011.2. Ryszard Piotrowicz, Anna Jegier, Dominika Szalewska i wsp.Rekomendacjew zakresie realizacji kompleksowej rehabilitacjikardiologicznej:stanowisko ekspertów Sekcji RehabilitacjiKardiologicznej i Fizjologii Wysiłku Polskiego TowarzystwaKardiologicznego, Wydawnictwo AsteriaMed, 20
	Supplementary literature	. 1. The White Book (WB) of Physical and Rehabilitation Medicine (PRM)inEurope,20182. Cifu D., Lew H.: Braddoms 2. Rehabilitation care: a clinical handbook.Elsevier, 1st edition 2017. 3. Giermek i wsp.: Wyroby medyczne
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	Discuss the use of the exoskeleton in rehabilitation. Present clinical conditions requiring the use of cranes, wheelchairs, hoists, orthoses and prostheses. List the stages of rehabilitation after a heart attack. List the methods of rehabilitation after ischemic stroke. contaminate devices used for functional diagnostics of patients with cardiovascular diseases. Indicate the medical equipment needed in the rehabilitation of patients after spinal cord injury. Discuss the need for rehabilitation in audiology and laryngology.	
Work placement	Not applicable	

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